REMARKS

In the office action, the examiner rejects claims 1, 8-9 and 18 as anticipated by US Patent 5,041,792 to Thompson. The applicants respectfully disagree, and pursuant to a telephone conversation with the examiner on Feb. 8, 2008, those arguments are presented in writing herein.

By way of background, the Thompson patent is about reducing noise at the molecular or microscopic level. Magnetotelluric ("MT") surveying is electromagnetic surveying (e.g. for oil/gas) using only the very low level naturally occurring electromagnetic fields that exist on the earth as the survey source. The survey amounts simply to deploying receivers that can detect electric (or magnetic) fields. However, because the source strength is so low, great care must be taken to minimize noise. Some of the noise at such low levels results from the construction of the receiver antenna itself, particularly the electrode construction. (Each antenna typically consists of two electrically separated electrodes that are respectively connected to the positive and negative input terminals of some receiver detection circuitry.) This molecular level noise is discussed in col. 6 by Thompson, and is called thermodynamic noise and current noise.

The applicants' inventive method on the other hand is about reducing macroscopic noise generated in *electroseismic* surveying, which involves conversion of electrical energy to acoustic energy by mechanisms that exist naturally in rock. This response is stimulated by powerful man-built sources that send large electrical currents into the subsurface, then detect the converted seismic response with acoustic receivers such as geophones. The electrodes mentioned in the applicants' claims are *source* transmitter electrodes, not receiver antenna electrodes as in Thompson. The noise that is of concern in the present application is acoustic noise resulting from conversions of near surface current flow to acoustic energy. These are unwanted because the targets of interest are deep, not near surface, and because the acoustic receivers must be located on or near the surface and therefore must unavoidably be close and hence sensitive to the near surface conversions. The applicants' invention is a method for reducing this macroscopic noise, whose source has nothing to do with the composition or design of electrodes, which are source electrodes not receiver electrodes anyway.

A source of confusion is the presence of the word *electroseismic* in the title of the Thompson patent. As far as the applicants can tell, this is the only mention of electroseismic conversion in Thompson. As a guess, the intent behind its inclusion in the title was probably the notion that Thompson's inventive electrode design would be advantageous also in what might better be called seismoelectric experiments, the reverse conversion process from electroseismic. In seismoelectric as possibly envisioned by Thompson, tiny naturally occurring vibrations in the earth can experience conversion of their acoustic energy to very low level electrical signals, which can be detected by receiver antenna with low-noise electrode construction.

Thus, just looking at the preamble of the applicants' claim 1, Thompson does not disclose "a method for reducing noise from near-surface conversions of electromagnetic to seismic energy in an electroseismic survey." Nor does Thompson disclose "electrodes connected to the output terminals of a source signal generator," i.e. *source* electrodes. Thompson's source is the earth itself, which has no identifiable electrodes.

Now, moving beyond the preamble to the rest of claim 1, which is:

> positioning one item of conducting material or a plurality of such items electrically connected to each other to substantially minimize near-surface electric fields in a region between or defined by the item or items of conducting material, wherein in the case of a single item of conducting material the item is configured to define a region, thereby providing an area of low surface noise for survey receiver placement.

First see that the Thompson does not disclose "or a plurality of such items [conducting material] electrically connected to each other." The only items of conducting material shown in Fig. 1 are the two electrodes 10 and 12. They cannot be electrically connected to each other because then the receiver would not work because its detecting terminals would be shorted out. In fact, Thompson's Fig. 1 shows electrode 10 connected to one terminal of voltmeter 18 and electrode 12 connected to the other terminal of voltmeter 18. Points in a circuit that are electrically connected have the same potential, meaning the voltmeter must always read zero if 10 and 12 were regarded as being electrically connected. Electrodes 10 and 12 are electrically connected to different terminals of a voltmeter, but not to each other.

That being the case, then the question.becomes does Thompson disclose "a single item of conducting material" that "is configured to define a region, thereby providing an area of low surface noise for survey receiver placement." The applicants' Fig. 5 shows an example of this, but Thompson does not. The examiner points to col. 5, lines 25-30 in Thompson. That passage describes a cylindrical electrode one meter long and one centimeter in radius. The electrode is straight, as 10 and 12 are shown in Fig. 1 or as is shown in Thompson's Fig. 5, not bent into a circle or closed polygon as shown in the applicants' Fig. 5. Thus, Thompson does not show an electrode that "is configured to define a region, thereby providing an area of low surface noise for survey receiver placement."

Similarly, claim 8 is limited to an embodiment of claim 1 in which there are "two or more near electrodes connected to a first output terminal of the source signal generator" *and* "at least one far electrode each connected to a second output terminal." The examiner points to the six electrodes in Thompson's Fig. 2, but *no two* of these electrodes is shown connected to a common input terminal of a voltmeter, much less to a common terminal output terminal of a signal generator as required by the applicants' claim 8. Furthermore, the applicants do not understand how col. 3, line 65 can be read to show the claim feature "separated from all the near electrodes by a distance sufficient to cause current to penetrate a depth of interest in the subsurface formation."

Responding to the remainder of the examiner's comments, Thompson's V_1, V_2 and V_3 denote voltmeters, not electrical signal sources. The mention of Ohm's Law at col. 4 lines 33-34 is not related to nor does it suggest measuring seismic response. Finally, regarding claim 9, the applicants believe that electrodes 10 and 12, as shown in Thompson's Figs. 1 and 2, are vertical (and not electrically connected).

It may be clearer if the words "electrically connected" in claim 1 were replaced by the words "connected by electrical conductor." This amendment is made herein, along with a similar clarifying amendment to claim 8. Claim 18 is amended to delete superfluous words. The applicants request the examiner to grant discretionary entry to these claim amendments.

CONCLUSION

The applicants respectfully believe that the preceding arguments demonstrate that pending claims 1, 8-9 and 18, particularly as amended herein, are patentable over Thompson and all other art cited by the examiner. The applicants believe the same applies to claim 14, which was not withdrawn. As stated in the applicants' response of Oct. 19, 2007, the applicants request that withdrawn claims 10-13, 15-17 and 25 be reinstated.

The Commissioner is authorized to charge any additional fees which may be required, to Account No. 05-1328.

Respectfully submitted,

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